RISK MANAGEMENT PROCESS IMPACTED TO THE PROJECT PERFORMANCE IN OIL AND GAS INDUSTRY AT KUALA LUMPUR

FAKHRUL RAZI BIN ROSLI

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Faculty of Industrial Management

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ABSTRACT

Oil and gas industry is the industry that yield profit to every nation. It will involves with various step of risk. This research study will is trying to study the relationship between the risk management processes with the project performance. This research will be conducted in Kuala Lumpur which is a hub for the management oil and gas organization. A questionnaire that contain of demographic section, personal information and any related question to the risk management that might give contribution to the project performance every employee know about. Every question will contribute to the hypothesis that already develop in the beginning of the research study. A total 100 questionnaire were distributed and about 80 are requiring representing the population of the research study. The questionnaire was distributed by using male that contain link to the online questionnaire that very helpful in collecting data. After a few week the data already collected. The first step is test the reliability of the questionnaire that answer by the respondent by using SPSS software. Next the first objective also using the SPSS software to rank the important step of the risk management process to the project performance. To determine the hypothesis, once again the SPSS software being used to determine the hypothesis accepted or rejected. The risk management process are very important in determine the project performance. In this research study, there is two indicator for project performance which is time and cost. The finding shows the relationship between risk management process with time and cost. The relationship can be negative or positive to the project performance.

ABSTRAK

Industri minyak dan gas adalah industri yang menghasilkan keuntungan kepada setiap negara. Ia akan melibatkan dengan pelbagai langkah risiko. Kajian penyelidikan akan cuba untuk mengkaji hubungan antara proses pengurusan risiko dengan prestasi projek. Kajian ini akan dijalankan di Kuala Lumpur yang merupakan hab bagi organisasi pengurusan minyak dan gas. Pada peringkat permulaan soalan di buat sebanyak 4 bahagian. Bahagian pertama mengenai maklumat peribadi responden, dan yg kedua adalah maklumat organisasi responden. Seterusnya adalah maklumat tentang prestasi projek yang pernah pekerja terlibat. Dah bahagian terakhir adalah factor yang ada didalam proses mengenal pasti risiko. Soalan diedar melalui laman web dan dihantar kepada para pekerja. Setelah tamat tempoh masa untuk menjawab soalan dikira menggunakan perisian SPSS. Perisian ini digunakan untuk menentukan onbjektif kajian ini yang pertama iaitu menegenal pasti proses yang manakah yang paling menyumbang kepada prestasi projek. Dengan menggunakan perisian ini juga, objektif kedua juga dapat dicapai iaitu utntuk menentukan kehadiran hubungan antara proses mengenal pasti risiko dengan prestasi projek. Sebanyak 100 soal selidik telah diedarkan dan kira-kira 80 yang memerlukan bagi mewakili populasi kajian penyelidikan. Proses pengurusan risiko adalah sangat penting dalam menentukan prestasi projek. Dalam kajian penyelidikan ini, terdapat dua petunjuk untuk prestasi projek yang merupakan masa dan kos. Dapatan kajian menunjukkan hubungan antara proses pengurusan risiko dengan masa dan kos. Hubungan boleh menjadi negatif atau positif kepada prestasi projek.

Table of Contents

LIST OF TABLE

LIST OF FIGURE

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND STUDY.

Malaysia is a country in southern Asia that divided into two regions by the South China Sea, the two regions include of peninsular Malaysia bordering with Thailand and Singapore. While east Malaysia are bordering with Indonesia and Brunei. With the huge area of natural resources on the agriculture, forestry, and minerals. After collapse the tin market on 1980's, petroleum and natural gas took over the as a stronghold contributor to the Malaysia economy. In 2004, Malaysia on 24th in terms of world oil reserves and 13th for natural gas. According to the PETRONAS, oil and gas asset that have by Malaysia equivalent to 20.18 billion and the government estimation on the production rate, the supply of the petroleum will last for 18 years, meanwhile that natural gasses will last for 35 years

In the oil and gas industry the risk management is very important in term of safety or in business sector. Risk is a measure of a probability and consequences of not completing the goal that was set up (Harold, 2009). In risk it contain of two component, which is a probability of occurrence of that event and impact of event happen. To handle this risk, they have a few frame work, techniques, and formula to handle the occurrence of the risk. According to the PMBOK 4th edition 'risk management is the act or practices of dealing with risk that include planning, identifying, analyzing, developing, response, and monitoring and controlling the risk to determine how they have changed.' Risk

analysis is a systematic process to estimate the level of risk for identified and approved risk (Harold, 2009). In pipeline industry it tend to more technical risk evaluation that highlight a few things. Such as provides technical foundation, determine the program risk, relates and analyze the internal and external risk, prioritizes risk impact. There is two type of risk that can be study; qualitative and quantitative. Qualitative risk is more to assumptions the risk with the help of matrix diagram and expert opinion with the relevant reasons and logical data (Edmund, 2003). Quantitative is more to mathematical process that involve probability to develop a model of the risk.

The risk management in oil and gas industry needed because it will provide a technical information or basic about technical process, a programs risk can be describe and identify, investigate the risk and relationship with the internal and external factor that contribute to the risk, prioritizes the risk of the after effect of the programs, and record the documents technical basic and risk for the risk evaluation. To do the evaluation of the risk on the pipeline there are several tools that can be used such as Delphi technique, estimating relationship, expert judgment, fault tree analysis, network analysis, and risk mapping matrix with risk scales results. The benefit by performing the risk management in pipeline sector, it can change the result on the technical risk into risk level. When qualitative risk technique apply the outcome will show the cost risk, schedule risk, or technical risk, or technical risk boundaries. When the quantitative risk analysis performed a risk rating can determine the output on the indication of the potential importance of risk program that usually measure by probability of how many times the event occur in certain times.

In this kind of field that dealing with high risk in the technical part it need to focus every time when dealing with the job. The issue will arise if management did not apply risk management. The first problem that may came out is unclear vision of on risk that exist on surrounding either on the aspect of business of the workplace safety. Other challenges is did not have good strategy to reduce, mitigate, or transfer the risk that have in the management or workplace. By not concerning on risk management they also may have a lack of information to make informed decision on issue critical to project success.

1.2 PROBLEM STATEMENT

Risk has always been perceived negatively. In oil and gas industry also happen the same problem, actually risk also have type that can give a positive impact to the organization. Nowadays Malaysia are developing country and have so many oil and gas company that located here. Most of the process of the risk management process are focus to the negative impact and when they mitigate the risk, they only at there and doesn't create any profit from the risk mitigation process. Base on statement from the (David V. Tennnant, 2005) mostly of us are anticipated with the problem with the will develop when the project are initiate and the thinking are focus to negative side. On the other hand, actually have a positive risk that exist that can give benefit in triple constraint and in this study it will help to reduce the duration of the completion date of a project. In the process risk management it will have the step to identify the risk either the risk is positive or negative. The first process is communicate and consult the risk.

Base on the framework that suggested by (T. Aven, 2005) the process of finding risk are not only focus in the internal site of the organization, it also focused on externally. For an example the shortage of the expertise in the pipeline inspection or welder, it will give a bad impact to the project. The management tends to find a solution like appoint someone else that are not familiar and might contribute to the high risk impact if accident or error occur. In a positive side, the management can hire an outsource expert that have a qualified in the process that potential risk. If this outsourcing are conducted, the risk will reduce and it will give a low level of risk and it can give positive impact on the time to complete the project that related. The framework also have the table that rank every risk according to the level of the priority to concern about. Then the final step in the framework is developing the mitigation strategies in the form of table that have the list of the positive risk and negative risk that already rank according to the level of importance. In the table also stated a few strategies to handle the risk.

After complete the risk mitigation strategies that according to (Kerzner, 2009) the framework will be continuing reevaluating it and developing contingency plans or fallback position. And the process is the risk review that have relationship between the risk analyses and this risk review, which is after risk already determine and rank into level of the risk. The risk will be review back during the process of the project. The result of

the analysis it can help increase the effectiveness of work and it lead to the short the duration of the project and it will focus more to the resources.

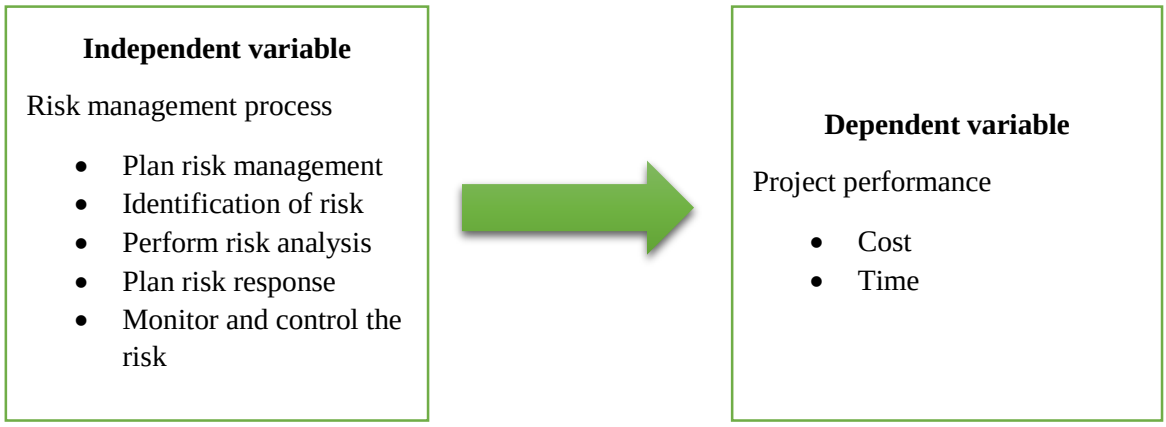
For the problems that facing by the industry right now is they are more focus on the negative risk and will put more effort to mitigate it. There are gap in this kind of situation and by performing the process of management risk it will fill the gap, which is the gap refer to the positive risk that might positive impact to the duration and the cost of the project. for an example at the beginning stage of the process to develop the plan for the risk where the process communicate and consult will take place between internal and external stakeholder their brief on the more positive impact suggestion and can give advantage in the duration of the project (Carmen, 2007). Next is the process of the identifying the risk and it should more focus on the internal and external positive risk than follow by the negative risk. By doing this way it can help the oil and gas industry alert with the opportunity that have and it will become the competitive advantage to the organization. Then is performing the risk analysis of the listed risk and the positive should rank in the top of the ranking and give priorities to develop a strategies to receive or avoid the risk. Further step is the risk response, for an example a research team will calculate what the impact is if the risk are considered to the duration of the project and the cost of the project. And lastly, the monitoring and controlling the risk to make sure the risks are treated well various perspectives.

1.3 RESEARCH OBJECTIVES

1. To identify the effectiveness of risk management process towards project performance.
2. To explore the relationship between the risk management process and the project performance.

1.4 CONCEPTUAL FRAMEWORK

The framework that are used in this research study about the relationship between risk management process impact to the duration of the project are consist of component like establish the context, identify the risk, analyze the risk, evaluate the risk, communicate and respond, treat the risk, and monitor and review the risk.



1.5 RESEARCH QUESTION

1. How does the risk management process give impact on project performance?
2. Is there positive risk in project?

1.6 RESEARCH HYPOTHESIS

There is a relationship between risk management process and project performance. The hypothesis can be determined as:

H1: There is significant positive relationship between risk management processes to the project time performance

H2: There is significant positive relationship between risk management processes with the project cost performance.

1.7 RESEARCH SCOPE

This research study will be conducted at the Kuala Lumpur, according to (Koh|, 2013) in the Kuala Lumpur have about 1500 thousand of employee in the oil and gas industry and they are come from various company such as PETRONAS, SHELL, EXXON, Kencana Petroleum and many more. This research will use small sample from the amount of the workers to carry out the test. Base on the monthly bulletin of the institutional of engineers on 2013 the total resources.

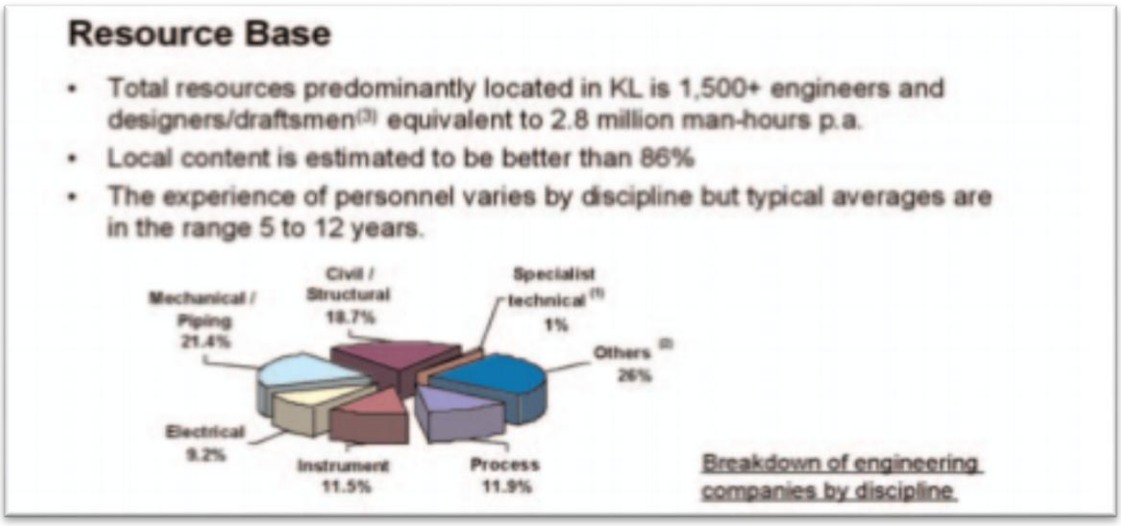


Figure 1.7: Percentage of the workers that works in oil and Gas Company in Kuala Lumpur.

Source: The Monthly Bulletin of the Institutional Of Engineers, 2013

1.8 SIGNIFICANT OF STUDY

This study is will contribute to the effectiveness of the risk management process towards the project performance. The project performance can divided into 2 terms which is cost and time (schedule). This risk management process will obtain from the literature review related to the risk management system that applies in the oil and gas company in Kuala Lumpur. The study will explore the component in risk management process that influences the successfulness of the project performance. The

The study also investigates the relationship between risk management process and the project performance. Risk management process is process to identify the component that might give impact to the project performance. It also will help other organization to not only focus on the negative risk that exist but try to find and prioritize the positive risk as a first step. This research also can be apply in any field that playing with the risk such as manufacturing, private sector, customer service, engineering, food industry, and also business risk.

1.9 OPERATIONAL DEFINITION

Risk

Long definition: the probability and magnitude of a loss or profit from a disaster, unexpected event or risk from opportunity.

Risk management process

According to (V M Rao Tummala, 1999) are structured approaches to identify and understanding potential risk factors and assessing consequences and uncertainties associated with the base these identified risk factors. This process will contain a few steps that need to be following for dealing with any types of risk in various fields.

Project performance

The successfulness of a project achieves the initial objectives in terms of time and cost.

1.10 EXPECTED RESULT

This research study has a goal to help an organization that deals with the risk every day in term of safety or management decision process. The risk management process also will determine the factor that will help to give positive impact toward the project performance. Next is the aim of this it will valid and can be apply to the other industry and it will help any field to get better result in project performance of the project that they are performed.

CHAPTER 2

LITERATURE REVIEW

2.0 RISK MANAGEMENT PROCESS

Before start a project, the important things that need to be view is the risk that exist in the project. If the risk ignore by the organization or project team it tends to give a negative impact to the organization or the project that are running. Risk are not typically refer to technical issue of finance and now it more to safety, business entering risk and many more (Emblemsvåg, 2010). To deal with the risk there a few techniques to reduce, eliminate or mitigate. There is a plan to deal with the risk. In the plan, it can also contribute to the successfulness of the project in term of duration. For an example, the identification process are tends to search on negative risk, it will lead to the poor project performance. In the risk management process there a few steps that must be follow to make sure the risk are did not affect the project performance. The steps start with the plan of risk management that will focus more on to the management work such as documenting, dividing a task and responsibility of the team. The next step is the process of risk identifying by the organization and project team. This process are examine the high probability field, place, or situation that have risk to the project duration. The third steps is the performance risk analysis and according to (Kerzner, 2009) this process are identify risk and measure the probability and find the impact to the project or organization. After completed the analysis of the risk, risk response plan are develop to selects, evaluates, identifies, and implements the solution to the risk to make sure the risk

are not threatening the duration of the project. The last steps in risk management process are the step of monitoring and control risk. This process is existing to make sure that the risk are treated well and will have small probability impact to the project that are currently execute.

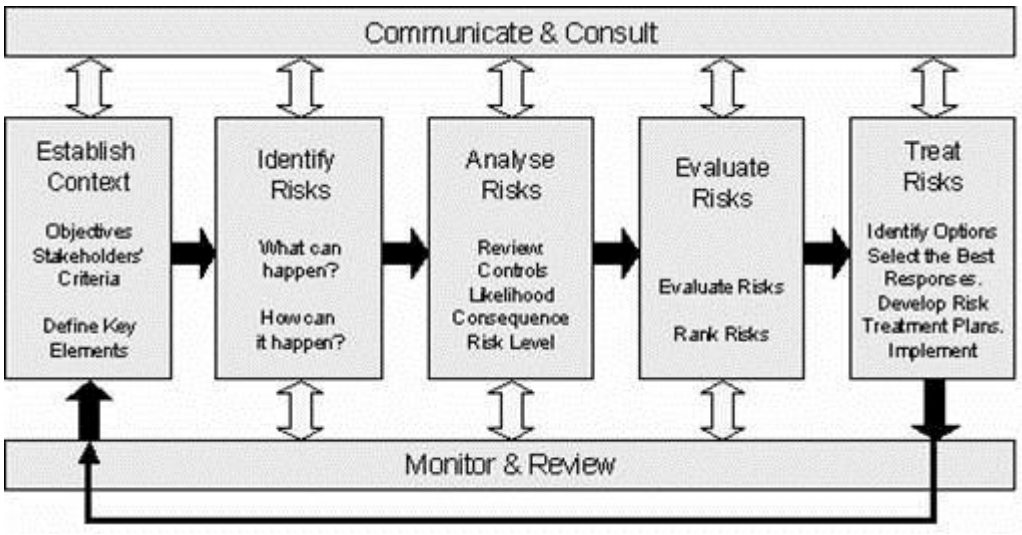


Figure 2.0: The risk management process and flow.

Sources: Australian and New Zealand Standard for Risk Management AS/NZS 4360

2.1.1 Plan Risk Management

These processes are the first step of the risk management process to deal with the risks that exist in the organization or project. In this initial phase, a team will be formed, document that relate to the risk management will develop. Planning of the risk management also will formed the risk management strategy that are include both the process and implementation for the project. According to (Kerzner, 2009) it very easier to develop from the beginning of the project rather than developing the risk for already ongoing project. this is because the development of the risk management plan on the problematic project will tends to extends the duration of the project and it will incurred high cost.

According to (Berg, 2010) the component that should have in the risk management plan is purpose of the risk management plan, objective, alternative expertise that needed, forming of responsibilities for identified area, determine the assessment process and

department involve and also rate the risk in scale. This risk management plan also need to start the development of the procedure the response strategies.

This risk management plan need to performed well because according to (Mu, Peng, & MacLachlan, 2009) if problem related to the risk happen it will delay the project and will consume additional resources and will inflate project cost and lead to project failure. This initial step also will be guidelines for the team that to deal with the risk information and lead them to understand clearly the goals, objectives, method and techniques, reporting, communication and documentation. In the risk management plan the content should have the appropriate definitions of risk that exist in the organization or project, ground rules, reliable technique to analysis the technique to deal with risk.

2.1.1.1 Risk Management Strategy

According to (Aldridge, 2103) the function of the risk management strategy is to control risk that might happen in the company such as the relationship in existing business between the client and the management. The FMD Consultant Limited highlight publish that the risk management strategy is the subset of the corporate Risk Management Strategy have a relationship in development of software applications, presentation of information to the public and the provision of methodology documentation.

The strategy that will help the risk management plan is being more specific to the area that has high probability impact. According to that statement, the efficient techniques must be develop to deal with the risk that exist in the area compare to the other area that also have risk but not giving a high impact to the project duration. An example of statement of process techniques that propose some method to conduct a risk analysis is reasonable since it will give good advantages to the project.

2.1.1.2 Risk Management Training

Next component that are important in risk planning process is the training. The training module need to be exposed to the person or organization that will face the risk. specialist must be appointed to teach the project team how to make risk management work and implement the steps and bypass the consideration, focus on a minor subset of risk management. This training are effectively if it conducted by individuals. The individual can be the person in the project or outsourcing firms relate to the risk management. This

person must have experience dealing with the risk that almost or similar to the current project that are planning or performing. According to (Mu et al., 2009) it will be redundant if the training are conducted only with the academic exercise. Finally, the training must be divide into several group that performed different job in the project and it will lead more focus of the team to the risk surround them.

2.1.2 Risk Identification

Risk identification is the process of the finding the risk that exist in the project or organization (Hubbard, 2009). In this step, the risk are initially classify into several type of risk before proceed to the next step. This information can get from the survey of the project, customer, and stakeholder involve. The risk always have in the form of technical, production, logistic and other things. These can contribute to the increasing of duration project if the risk are not take serious action. Technical risk more refer to the technology of engineering and mostly risk that exist in this field is machine problem, equipment not function, design problem and many more. Production risk more focus on the manufacturing field such as packaging, lead times, and resources availability. Other type of risk that suggest by (Kerzner, 2009) is and PMI, is external risk, which is divide in to two section; predictable and unpredictable. Next is the internal risk that refer to the risk that relate to the internal management such as employee turnover, cash flow problems. Next that suggest by the PMI is technical risk that contain of process of change to the new technology. This change might have risk that can give impact to the duration if the project. The last type of risk is legal risk, which is it involve licensing, government law, and contractual failure.

2.1.2.1 Type of risk

1. ***Predictable and unpredictable***

   According to (Sawant, 2010) Predictable risk is the risk that are already identify and already ready with the plan to deal with it. For an example, availability of the raw materials is predictable risk and if this risk are not taking seriously, it will lead to the delaying the project completion date. Unpredictable risk is the most dangerous risk that are worried by any organization because of the effect of the risk absolutely will give impact to the duration, cost, and work of the project. Example of the unpredictable risk natural disaster, accident of the

workers, government regulations. Every organization must include these types of risk in their risk management process and if this risk occurs, the organization is ready to face the consequences.

2. Internal risk (non-technical)

According to (M.A., 2000) the internal risk may be in the organization itself and it can be control by the project manager and also it can affect the duration of the project. One of the source of this internal risk is employee turnover. If this kind of things happen to the organization that currently performing project and it in the crucial phase and this problem happen the project will delay because of the no employee will be performed the work at the crucial stage and it will consume more time to get a new employee and to train them. Another source is the safety issue in organization or project. If accident happen during the project it will lead to the delaying a work. The process of investigation the accident will consume a lot of time until the report is produce and after that the project will be execute back but it already increase the duration of the project. at the beginning of the risk identification, risk that related to the safety of the employee or the project team need to be prioritizes and put it in the high probability risk that might be occur during the project.

3. Technical Risk

According to (Division, 2010) this risk significantly occur in the organization or project, this risk might exist in the stage of planning and executing. Example of the risk is the changes in technology. The changes of the technology can give impact to the duration of the project by the process of adaptation with the new changes. The new technology require team in the project learn how to use or operate the new technology. This will contribute to time consuming and incur a lot of cost. To adapt with the new technology time will spend to training how to use, how to deal with the technology if have problem with the technology.

According (Simon, 2007) the other example of the technical risk is design or plan of the project that can be extracting from the WBS. In the beginning of the project all the project design and scope of work already determine and agree by

the two party, suddenly in the middle of the project the design need to be change due to the design that change the responsible person. This problem will be the risk that can give impact to the duration of the project. When the design change, all the scope of work will change, and everything that already made need to dismantle back and build the new one and this process will extends the duration of the project that currently performing.

4. Legal risk

According to the (Malyshev, 2011) legal risk are risk that related to law. For an example the risk involve the licensing process. This licensing process are very important because if the project are conducted without get the appropriate licensing, responsible bodies might take an action to the organization such as terminate the operation and contribute to the increase of the project duration also will need a lot of cost to pay the fine.

2.1.2.3 Method That Use In Risk Identification

1. WBS decomposition

According to (T.Rajani Devi, 2012) the WBS or the Work Breakdown Structure is essential as parts of the project cycle and it is very important part of project planning. The used of this WBS is to help the organization to develop the scope of work for each team or department, it also will help in determine the responsibilities and the most important parts and relate to this research study is it can determine the accurate project estimation of coast, risk and time of the project that performed. In the WBS it contains work packages, key elements, and work breakdown structure and milestone. What is the purpose of this work breakdown structure? The main purpose of this technique is clearly state and sort the scope of project in details, accurate, and specifically. The common mistake in doing the WBS most of the organization are make it as organizational hierarchy and it not describe and explain the scope of the project and is not outcome oriented.

2. Expert judgment

According to (Rosqvist, 2003) expert judgment have a generic roles in risk identification qualification it has the role as decision maker, referenda, normative expert, domain experts, and stakeholders. The expert judgment will help the organization to identify the risk based on their expertise and experience deal with the related risk that can give impacts to the projects performance in term of cost and time.

3. Lesson learned files

Another source of the risk identification is the come from the lesson learned files. Example of the lesson learned file is like report after the accident or risk occur, journal, case study, research in related topic and many more (Graf, 2011). From this source, the risk identification are more effectively identify. Every conclusion and component in the lesson learned files might be happen again to the existing project and it also might give same impact like previous case. Mostly, the impact are affect the project cost and project duration.

4. Schedule analysis

Next source is the schedule analysis that performed in the early stage of the project. One of the component or example schedule analysis is at critical path method. From the CPM it wills shows where the potential risk exists and normally it will interpreted (David T. Hulett, 1995) the high probability risk. This source provides the timeline of the project and also states the scope of work in the project. The schedule also will have the information about the resources usage, resources availability, and resources cost. When have some lack in the schedule arrangement on the schedule in term of resources and scope of work that must assigned to the specific tasks in the schedule the performance on the project completion date will affected and lead to low performance of project on cost.

2.1.3 Risk Analysis

According to (Kerzner, 2009) risk analysis is a few strategic steps to calculate the level of risk to approve the identified risk. This process involving the process of estimating the probability of occurrence and consequences of occurrence and converting

the risk to the risk level. In the risk it be categorize in to three level which is low, medium and high. The low risk is risk that give small impact to the cost, schedule performance (duration of the project), and technical performance. Meanwhile, the medium level is regular effect to the cost, schedule performance, and technical performance. The most give impact to the cost, schedule and technical performance is the high level risk and at this stage it needs an attention from the top management.

2.1.3.1 Tools For Risk Analysis

Delphi technique

This technique is the technique that require the expert in related field present their outcome to deal with the risk. This technique are develop by the Daley and Helmer (1963). This method was exist to get the outcome and solution from various expertise within certain topic. They also quote "two heads are better than one, or..n head is better than one" (dalkey, 1972). This technique was performed in forms of group and it require a communication between the group members with the aim to check on the examinations and discussion on specific issue for finding the risk, set up policy, predicting the risk.

This technique was apply to the various field such as policy development, need assessment and resource utilization (Ven & Gustafon, 1975) and they also indicate that this technique can performed this:

1. To find the alternative in the possible program
2. To investigate and expose the assumptions or information leading to different judgment.
3. To seek out information that can build consensus on the part of the respondent group.
4. To correlate information judgments on a topic spanning a wide range of discipline.
5. To educate the respondent group as to the diverse and interrelated aspects.

The characteristic Delphi technique is made series of questionnaire to collect data form a panel of selected subjects. This technique only focus to the concerning topic only (Ludwig, 1994). In this technique the expert are allowed the expert to recheck the initial judgment and provide the alteration of the opinion. This technique can provide anonymity

to respondent, a process of controlled feedback process, and provider to the variety of statistical tool techniques to present the data (Dalkey, 1972).

The process of Delphi technique have 4 step and it begin with step 1 which is the where the open ended questionnaire serves as cornerstone of the specific information about the area that currently working. And the next step is where the Delphi panel get a second questionnaire and is stated to review the summary item by the investigation. Next is the panelist will get a questionnaire that includes the topic and ranking summarize by the investigators in the last step and are need to revise the judgment to specify the reason for remaining outside the consensus (Pfeiffer, 1968). The last step is the process of get the list remaining items, their rating, minority opinions, and items achieving the consensus are distributed to the panelist.

Decision tree

Decision tree is another method to analysis the risk in nowadays. This techniques usually use when someone wants to get into business and the risk will be calculate by using this technique. This technique are consider the most popular approaches for representing the classifiers. A decision tree is explain the method as a recursive partition of instance space (Oded Maimon, 2000). This technique contain of points that form a rooted tree, meaning it is a directed tree with a point called root that no input because it started the process of the decision tree. A point that arrow pointing out is called an internal point or test point. At the decision tree, every point break the instance space into two more sub-spaces according to the decision.

Each of the component is points to one class representing the most appropriate target value. And the component have the value of probability and have a value. Instances are classified by navigating them from the root of the tree down.